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*Attorney for Defendants*

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF WYOMING

TIMOTHY MELLON,	)	
	)	
Plaintiff,	)	<b>Cause No. 13-CV-118 SWS</b>
	)	
vs.	)	
	)	
THE INTERNATIONAL GROUP FOR	)	<b>DEFENDANT'S DESIGNATION OF</b>
HISTORIC AIRCRAFT RECOVERY, a	)	<b>EXPERT WITNESSES</b>
Delaware non-profit corporation and	)	
RICHARD GILLESPIE,	)	
<hr/> <b>Defendants.</b>		

Pursuant to this Court's October 10, 2013 order and U.S.D.C.L.R. 26.1, The Defendants,  
THE INTERNATIONAL GROUP FOR HISTORIC AIRCRAFT RECOVERY, a Delaware non-

profit corporation and RICHARD GILLESPIE, an individual disclose the following expert witnesses:

1) **James Ian Ebert, BA, MA, Ph.D.**

(A) **Written Report:** See Exhibit B.

(B) **Field of Expertise:** Anthropology, archaeology, use of the scientific methods and techniques of photogrammetry, photo analysis, digital imaging and image processing, and digital mapping technologies.

(C) **Qualifications:** See Exhibit A. Dr. Ebert is an anthropologist, an archaeologist, and a forensic scientist, and in each of these professional areas makes intensive use of the scientific methods and techniques of photogrammetry, photo analysis, digital imaging and image processing, and digital mapping technologies. Dr. Ebert has more than 30 years of experience in the application of these methods and technologies in analyzing, measuring and mapping details of crime and accident scenes, archaeological and historic sites, and aspects of the interaction of the environment and cultural use of the landscape through time, using historic aerial and other photographs and image sources.

Dr. Ebert is also Certified Photogrammetrist.

(D) **Designation of Opinion and Methodology:** See Exhibit B.

(E) **Publication and Deposition Testimony:** See Exhibits A and C.

(F) **Fees:** Dr. Ebert, \$245.00/hour, Professional Associate, \$115.75/hour, Photo analytical assistant/digital mapping, \$69.25/hour, Technical Assistant, \$53.50/hour, Clerical, \$29.25/hour.

**[Continued next page]**

2) **Dr. Les Kaufman, Ph.D.**

(A) **Written Report:** See Exhibit E.

(B) **Field of Expertise:** Marine biologist specializing in coral reef biology and geology.

(C) **Qualifications:** See Exhibit D. Dr. Kaufman has been diving on and studying coral reefs in the Pacific, Atlantic, and Indian oceans for more than forty years, approximately 2500 SCUBA dives, four prolonged saturation and surface-support missions, and the routine use of several remote operated and benthic camera sled vehicles. For the past six years Dr. Kaufman has been an active member of the Phoenix Islands Protected Area Research Team and was on a month-long 2009 expedition to PIPA that included a several-day stay at Nikamaruro, snorkeled areas between the main channel and the Norwich City wreck in addition to dives on the seaward face of the reef around the atoll edge. Dr. Kaufman has examined a very wide range of metallic and other man-made objects that had been lost or abandoned in coral reef environments for anywhere from a few days to many decades or centuries underwater including a good deal of military and aeronautical debris. Dr. Kaufman is frequently involved in the analysis and interpretation of underwater video as part of our assessment work on coral reefs, in the Gulf of Maine, and in tropical great lakes.

(D) **Designation of Opinion and Methodology:** See Exhibit E.

(E) **Publication and Deposition Testimony:** See Exhibit D.

(F) **Fees:** \$250 per hour plus expenses.

3) Any expert disclosed by Plaintiffs.

4) Any expert needed for rebuttal, impeachment or foundation.

[Signature page follows]

Dated this 15<sup>th</sup> day of April, 2014.

DEAN & CARTER, PLLC.

By \_\_\_\_\_ /s/  
William J. Carter  
Attorney for Defendants

John A. Masterson  
Lewis Roca Rothgerber LLP

## EXHIBIT A

### Résumé

James Ian Ebert  
Ebert & Associates, Inc.  
3700 Rio Grande NW, Suite 3  
Albuquerque, NM 87107  
(505) 344-2345

Born: Washington, DC; June 30, 1948

#### ACADEMIC STUDIES:

BA Anthropology (cum laude): Michigan State University, 1971  
MA Anthropology: University of New Mexico, 1977  
Ph.D. Anthropology: University of New Mexico, 1986

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**1984-Present: Chief Scientist, Secretary, and Treasurer of Ebert & Associates Inc., 3700 Rio Grande Blvd, Suite 3, Albuquerque, NM 87107, (505) 884-4114.**

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#### EBERT & ASSOCIATES PROJECTS AND RESEARCH

National Park Service: Compilation of technical publication entitled *Measuring Archeological Site Erosion with Aerial Photographs*. Interagency Archeological Services, San Francisco, 1985-1986.

US Army Corps of Engineers: Environmental impact research focusing on *Reservoir Bank Erosion and Cultural Resources: Mapping and Predicting the Erosion of Archeological Sediments at Reservoir along the Middle Missouri River with Sequential Historical Aerial Photographs*. Environmental Laboratory, USAE Waterways Experiment Station, Vicksburg, Contract No. DACW39-86-C-0071, 1986-1989.

US Army Corps of Engineers: Contract for *Feasibility Study: Analysis of Erodibility and Rate of Erosion of National Register Archaeological Sites on the McClellan Kerr Arkansas River Navigation System*. Environmental Resources Branch, Tulsa District, Contract DACW56-88-M-0216, 1987-1988.

National Science Foundation: Small Business Innovation Research (SBIR) Phase I and II grants (ISI-8722878): *A System for Distributional Archaeological Survey, Mapping, Data Management, and Analysis*. SBIR office, 1988-1991.

Department of Justice/Zuni Tribe: *Photointerpretation, image analysis, photogrammetry, and GIS mapping in support of land and water rights litigation*, 1986-present.

Navajo Tribe: *Photointerpretation and photogrammetry in support of Navajo/Hopi land rights litigation*, 1985-1989.

US Army Corps of Engineers: Workshop instructor, *Archaeological Sites Protection and Preservation Workshop, 12 Aug-16 Aug 1991, Pierre, South Dakota*. Workshop directed toward physical and biological processes affecting cultural sites, including reservoir bank erosion along the Middle Missouri River (class and field). Environmental Laboratory, Waterways Experiment Station, Vicksburg.

Department of Justice/Bureau of Indian Affairs: *Photointerpretation and Mapping of Traditional Irrigation and Water Use within the Navajo and Hopi Reservations.*

USDA Forest Service and other federal and State of Alaska agencies: *Exxon Valdez Oil Spill Archaeological Assessment.*

State of New Mexico Historic Preservation Division: *The Integration and Automation of Spatial and Nonspatial Cultural Resource Survey Project Data for New Mexico within a Geographic Information Systems Framework.*

Sandia National Laboratories: *Mixed Waste Landfill Site Photointerpretation and Mapping.*

Bureau of Indian Affairs and Department of Justice: *Design and Implementation of Geographic Information Systems structure and database for the Little Colorado Water Rights Litigation.*

Tanzania, East Africa (6-8/1989); *Field investigations at Olduvai Gorge to determine the feasibility of conducting distributional archaeological recording for archaeological analyses; transect survey, excavation, in-field artifact analysis.* National Science Foundation grant, to Dr Robert Blumenschine (Rutgers U).

Micronesian Archaeological Research Services, Agana, Guam: *Laboratory Coding of Lithic Artifact Attributes using Ebert & Associates' DART (Data Acquisition and Retrieval Technology) Software System.* 1992 through present.

Sandia National Laboratories, Albuquerque, New Mexico [12/93-6-94]: *Spatial and Temporal Analysis and Mapping of Waste Disposal and Land Disturbance through Historic Aerial Photointerpretation and GIS Applications: Technical Area 2, Sandia National Laboratories.*

Tanzania, East Africa [1/94-1/98]: *Distributional Archaeology and Excavations at Olduvai Gorge.* National Science Foundation Grant with Robert Blumenschine, Rutgers University.

Sandia National Laboratories, Albuquerque, New Mexico: *Spatial and Temporal Analysis and Mapping of Waste Disposal and Land Disturbance through Historic Aerial Photointerpretation and GIS Applications: Tijeras Arroyo Environmental Restoration Area, Sandia National Laboratories.*

City of Pueblo, Colorado: *Mapping of the plaza of El Pueblo from historic terrestrial and aerial photographs.* February-July 1995.

Getty Conservation Institute, Los Angeles: *Geographic Information Systems and Related Digital Technologies for the Integration of Historic and Contemporary Photographic, Remote Sensing, and Mapped Data at World Heritage Cultural and Other Sites -- Demonstration Project.* Start date approximately March 1, 1996.

Bureau of Indian Affairs/US Department of Justice. *Photointerpretation of Historic Irrigation on the Mescalero Indian Reservation.* 1996-1997.

Bureau of Indian Affairs/US Department of Justice. *Photointerpretation and Mapping of Historic Irrigation on the Zuni Indian Reservation.* 1996-1997.

Bureau of Indian Affairs/US Department of Justice. *Analysis of evidence of Prehistoric Irrigation on the San Juan, San Ildefonso, and Santa Clara Indian Reservations and Traditional Use Areas in the Santa Cruz and Chama Watersheds.* 1996-1997.

Department of Justice/Bureau of Indian Affairs. *Archaeological survey, mapping, and hydrologic and ethnohistoric analysis of prehistoric and historic Native American agricultural fields and water use for purposes of water rights litigation in the Rio Chama and Santa Cruz River drainages, New Mexico.* 1998-1999.

Historic Aerial Photo Analysis and Mapping in the matter of State of Arizona and the Little Colorado River System. Photogrammetric analysis and mapping on the Navajo Reservation in the Little Colorado River Basin, AZ, 1990-present.

Historic Aerial Photo Analysis and Mapping in support of General Stream Adjudication, State of New Mexico vs. USA. Photogrammetric analysis and mapping on the Navajo Reservation in the San Juan Basin, NM. 2005-2011.

## PREVIOUS WORK EXPERIENCE

Archeologist (Branch of Remote Sensing, National Park Service, 6/73-1/84): Research, development of remote sensing methods for cultural resource management, study. Dr. Thomas R. Lyons, supervisor.

## GRANTS

"A System for Instrument-Assisted Distributional Archaeological Survey." National Science Foundation Small Business Innovation Program Phase I grant, June-August 1987, \$30,000.

"A System for Distributional Archaeological Survey, Mapping, Data Management and Analysis." National Science Foundation Small Business Innovation Program Phase II grant, September 1988-February 1991, \$207,174.

"A Study of the Feasibility of Developing Generally Applicable Methods and Techniques for Conversion of Existing State Cultural Resource Databases to Geographic Information Systems." Phase I Small Business Innovation Research (SBIR) grant, National Science Foundation; NSF Grant No. III-9360278 received February 14, 1994, grant period 2/15/94-10/31/94, \$64,993.

"Rock Art Data Recording, Management and Analysis: An Integrated System Incorporating 3-Dimensional Digitizing, Geographic Information Systems, Photogrammetry, and other Digital Mapping and Imaging Technologies." Phase I Small Business Innovation Research (SBIR) Grant, National Science Foundation, start date March 1, 1996. \$74,670.

"Olduvai Landscape Archaeology Project: Aerial Photography and Photogrammetric Mapping Support." Principal Investigator. Research grant, Committee for Research and Exploration, National Geographic Society, Washington, DC. June-December 1996. \$19,750.

"Use of Remote Sensing Images to Evaluate and Monitor Condition of Prehistoric Earthen Structures." Principal Investigator. Research grant, National Center for Preservation Technology and Training, National Park Service. September 1996-December 1997. \$40,000.

"Rock Art Data Recording, Management and Analysis: An Integrated System Incorporating 3-D Laser and Contact Digitizing, Geographic Information Systems, Photogrammetry, and Other Digital Mapping and Imaging Technologies." Phase II Small Business Innovation Research (SBIR) Grant, National Science Foundation, start date July 15, 1998. Award No. DMI-9801160. \$299,966.

## FIELD EXPERIENCE:

Olduvai Gorge, Tanzania (6-8/89; 6-8/94; 6-8/95; 7-8/96; 12/97-1/98; 7-8/01; 8/02). Coordinator: mapping, cartography, and spatial database compilation and management; distributional archaeological survey and excavation. *Olduvai Landscape Archaeology Project* (funding by National Science Foundation, L. S. B. Leakey Foundation). Rutgers University and University of Dar es Salaam.

Oklahoma (1/88); field inspection for study of feasibility of using sequential aerial photographs for mapping site boundaries, erosion, and other impacts at sites at Corps of Engineers reservoirs along the Arkansas River. On contract with Tulsa District, Corps of Engineers.

North Dakota, South Dakota, and Nebraska (8/88-10/88); field inspection, survey and mapping of twelve reservoir-threatened archaeological sites along Middle Missouri River in conjunction with Corps of Engineers reservoir bank erosion study.

Tonque Pueblo, central New Mexico (6-7/87); surface distributional archaeological survey incorporating in-field computer data recording techniques, EDM mapping. Technique and software development and field research conducted under National Science Foundation SBIR Program award ISI-8660765.

Swaziland (6-8/86); ethnographic, environmental fieldwork for purposes of assessing environmental education and research needs and incorporating remote sensor data and methods into traditional sector environmental educational curricula.

Tuba City/Moenkopi, Arizona (3/86); aerial photo and map analysis and ethnographic fieldwork in conjunction with Navajo-Hopi 1934 Land Dispute land use assessments.

Palm Springs, California (4/84-10/84); field checking of photointerpretations of prehistoric and historic irrigation and other features on Cahuilla Reservation with Cultural Systems Research, Inc.

Green River Basin, Wyoming (6/84-8/84); remote sensing-directed, nonsite survey and analysis around Fontenelle Reservoir; sample design, EDM mapping, distributional survey; principal investigator. Branch of Remote Sensing, National Park Service.

Shenandoah National Park, Virginia (8/79); archaeological survey assisted by remote sensor-derived predictive model. Branch of Remote Sensing, National Park Service.

San Juan Basin, New Mexico (10/78); ground-truth checking of ecologic/cover-type stratification in support of cultural resources prediction and sampling. Branch of Remote Sensing, National Park Service.

North Slope, Alaska (6/77-7/77); field reconnaissance in support of remote sensing-based sample stratification for cultural resource sampling and prediction in the National Petroleum Reserve in Alaska. Archaeology Area Office, National Park Service, Anchorage.

Botswana, southern Africa (6/75-9/76); archaeological, ecological, ethnological fieldwork in Central District of Botswana. Middle, Late Stone Age archaeological survey and excavation; ethnoarchaeology and development planning work with Basarwa (Bushmen). Department of Anthropology, University of New Mexico.

Chaco Canyon, New Mexico (5-9/73; 6-8/74); survey, excavation of Pueblo-period sites associated with prehistoric roadway system; aerial photo interpretation and analysis of prehistoric roadways, archaeological sites, structures. Remote Sensing Division, National Park Service.

Kenya, East Africa (8-12/69); archaeological survey and excavation, Turkana Region under NSF grant. Department of Anthropology, Michigan State University.

Northern Michigan (6-9/67;6-9/68); archaeological survey and excavation of Woodland and early Historic sites. Michigan State University Museum.

**MEMBERSHIPS:**

Society for American Archaeology  
American Anthropological Association  
American Society of Photogrammetry and Remote Sensing  
(Member and Certified Photogrammetrist)  
American Academy of Forensic Sciences (Fellow)

**ANTHROPOLOGICAL/DEVELOPMENT-RELATED EXPERIENCE**

Remote sensing and GIS applications: Zuni Indian Tribe, New Mexico. For Institute of the NorthAmerican West, Albuquerque, New Mexico. Photointerpretation, remote sensing, and GIS applications for Zuni Indian Tribe land damage and environmental resource assessments, specifically in areas of erosion and other environmental degradation, forestry and forest resource assessment and inventory, and analysis of historic terrestrial and aerial photographs. Mr. Richard Hart, Institute of the NorthAmerican West.

Development Remote Sensing and Environmental Education (June-September 1986); develop curriculum for traditional-sector environmental education incorporating remote sensing in Swaziland; overview of conservation research needs in agriculture, range management, desertification control, drought response, erosion control, and recommendation of remote sensing-based solutions. Consultancy with Transcentury Corp., Washington, DC/USAID. Dr. Robert K. Hitchcock/Marilyn Richards, Transcentury.

Fieldwork with Basarwa (Bushmen), Central District, Botswana, June 1975 through September 1976. Ethnographic and ethnoarchaeological research on Basarwa settlement patterns, agriculture, education, and their relationship with other cultures, government and tourism in Botswana. Under auspices of National Science Foundation-supported research, Dr. Henry Harpending and Dr. Patricia Draper, Department of Anthropology, University of New Mexico. Continued research following fieldwork, to present. Co-president, Kalahari Peoples Fund.

Agricultural Training Consultant, Technology Applications Center, University of New Mexico/National Aeronautics and Space Administration, Albuquerque, April through August 1984. Conducted training program for visiting agricultural scientists from Peoples Republic of China in the use of aerial photographs and satellite remote sensing data, interpretation and analysis for agricultural crop and rangeland monitoring and assessment. Dr. Stanley A. Morain, Director.

Remote Sensing Consultant, Brown and Bain, Attorneys at Law, Phoenix, Arizona. Photointerpretation, electronic image analysis and related supportive fieldwork concerning Navajo Indian subsistence, settlement, and land use in the Navajo-Hopi 1934 land dispute. Mr. Terry Fenzl.

## FORENSIC QUALIFICATIONS

### COURT APPEARANCES AND QUALIFICATION AS EXPERT WITNESS:

1. Johnny K. Moore vs. the State of New York, Hon. Dolores Denman, State Supreme Court of New York, Buffalo (April 1980)
2. Helen Sikes Homicide, State Supreme Court of New York, Queens (May 1981)
3. Superior Court of California, Santa Cruz, CA (September 1981)
4. Lemuel Smith vs. State of New York, State Supreme Court of New York, Poughkeepsie (February-March 1983)
5. David Wayne Spence vs. State of Texas, Texas Northern District Court, McLennan County, Waco, Texas, June 26, 1984.
6. State of Washington vs. Brett Kendrick, Washington Superior Count, King County (Seattle), January 28, 1985.
7. State of Texas vs. Muneer Mohammed Deeb, 249th District Court of Texas, Cleburne, Johnson County, Texas, March 4, 1985.
8. Gomez vs. Four Seasons [civil], State Supreme Court of New York, New York County, March 12, 1985.
9. State of Texas vs. David Wayne Spence, Bryan, Texas, October 11, 1985.
10. State of New Mexico vs. Hererra [Grand Jury], Santa Fe, New Mexico, November 26, 1985.
11. State of Texas vs. Mann, Gatesville, Texas, May 21, 1986. 52nd Judicial District, Coryell County, Texas. Judge Robert Yale.
12. State of New Mexico vs. Hererra, May 23, 1986. Estancia, New Mexico. District Attorney Chet Walter.
13. State of Texas vs. Clifton Eugene Belyeu, Waco, McLennan County, Texas. District Attorney Vic Feazell. August 2, 1986.
14. State of California vs. Noguera, Orange County, California; Superior Court, Judge Robert R. Fitzgerald, April 6-8, 1987.
15. State of Texas vs. Joe Sidney Williams, District Court, McLennan County, Waco, Texas, May 13, 1987. District Attorney Victor Feazell (court hearing).
16. State of Texas vs. Joe Sidney Williams, District Court, McLennan County, Texas, August 27, 1987. District Attorney Victor Feazell.
17. State of New York vs. Robert Chambers, New York Supreme Court, Manhattan. March 3-4, 1988. Defense attorney Jack T. Litman.
18. State of Texas vs. Graf, Texas District Court, March 1988. Mr. Vic Feazell, District Attorney, McLennan County, Waco, Texas.
19. Damiani vs. Tecumseh Engine Corp., Binghampton, NY, February 1989. Mr. James Goss, Dean & Fulkerson, Troy, Michigan. Civil case, involving image analysis and accident reconstruction and mapping.
20. Roger Bolduc v. Connecticut Light and Power. Waterbury, CT, December 5, 1989. Mr. George D. Royster, Halloran, Sage, Phelon and Hagarty, Hartford, CT (plaintiff's counsel).
21. United States and the Zuni Indian Tribe v. Earl Platt. US District Court, Phoenix. Mr. Hank Meshorer, Chief of Indian Affairs, US Justice Dept., plaintiff's counsel.
22. State of Texas v. Muneer Mohammed Deeb, Ft. Worth, TX, December 8, 1992. Special prosecutor Bill Lane, Lane and Lane, Ft. Worth, TX.
23. United States v. Joy Beth Hubbard. Raleigh, NC, June 2, 1993. Federal District Court, Eastern District of North Carolina, Judge Earl Britt. G. Neil Yarborough, atty. (defense).
24. Cramer v. Harley Davidson. Catskill, NY, February 3-4, 1994. Defense attorney Arthur Thorn, Thorn & Gershon, Albany, NY.
25. State of Arizona vs. Fulminante. Phoenix, Arizona; June 1994. Defense Attorneys Dennis Jones and Chuck Steese.
26. State of Arizona vs. John Henry Carpenter (Bob Crane homicide trial). Phoenix, AZ; October 11, 1994. Prosecutor Robert J. Shutts.
27. State of Texas vs. Kizer Kip Grays. Pampa, TX; November 8, 1994. Defense atty. Robert Comer, Pampa, TX.

28. The Ekotek Site PRP Committee v. Steven M. Self, et al. United States District Court, District of Utah, Central Division. Case No. 2-94CV00277L. William Dryden, Elam & Burke, Boise, ID, defense attorney.
29. Rohm and Haas, et al. v. United States Liability Insurance Co., et al., Superior Court of New Jersey, Law Division: Mercer County, Docket No. MER-L-004664-95, January 20-21, 1999, Princeton, NJ, AND Rohm and Haas, et al. v. AIU Insurance Co., et al., Docket No. L-87-4920, Superior Court of New Jersey, Law Division: Mercer County, January 20-21, 1999, Princeton, NJ.
30. Jerry Young and Marguerita Breen-Young, Plaintiffs, vs. Edmund Healy, Defendant and Edmund Healy and Trudy Healy, Counter-Plaintiffs/Third-Party Plaintiffs, vs. Jerry Young, et al., Counter-Defendants/Third-Party Defendants. Eighth Judicial District Court, County of Taos, State of New Mexico. No. 96-103-CV. Trial testimony May 18, 2000, Taos, New Mexico
31. Robert Starks, Plaintiff, vs. Randolph "Duke" White, William Logan, and Dave Cordova, Defendants. US District Court, State of New Mexico, Civ. No. 98-00630-JC/WWD. Warren W. Edginton, Senior US District Judge. Trial testimony December 19, 2000, Albuquerque, New Mexico
32. El Rucio Land and Cattle Company, Inc., San Juanito Land Partnership Ltd., McAllen Trust Partnership, and James Argyle McAllen, Plaintiffs, vs. Forest Oil Company and Daniel B. Worden, Defendants. Arbitration testimony before the honorable Daryl K. Bristow, Clayton J. Hoover, and Donato D. Ramos. Testimony, November 7, 2011. Houston, Texas.
33. Chevron Corp. v. Donziger, et al. Federal Court, Case No. 11 Civ. 0691 (LAK). Testimony, November 1, 2013. New York, New York.

## CERTIFICATIONS, CONSULTANCIES AND ADDRESSES

Training curriculum, International Association of Arson Investigators Inc., Oregon Chapter 31, 29<sup>th</sup> Annual Advanced Fire and Arson Seminar, September 10-13, 2007, Bend, Oregon.

Invited keynote lecture, Evidence Photographers International Council, 2004 School of Evidence Photography, Albuquerque, NM, October 30, 2004

Forensic Guest of Honor, Magna cum Murder; Ball State University, Muncie, Indiana, October 26-28, 2001

Invited Workshop presentation: Aerial photogrammetry in Environmental Forensic Investigations. First International Congress on Petroleum Contaminated Soils, Sediments and Waters, 14-17 August 2001, Imperial College, London.

Invited Keynote Address, Trimble Navigation Systems Users Conference, San Jose, CA, October 14, 1998.

Certified Photogrammetrist, [ASPRS], (No. 534), American Society of Photogrammetry and Remote Sensing

Photogrammetrist, New York State Police Medicolegal Investigations Unit, 1985-present.

Research Associate, Technology Application Center, NASA/University of New Mexico, Albuquerque, New Mexico, 1980-1994.

Consultant, US Army Central Identification Laboratory, Ft. Shafter, Hawaii; image analysis and photogrammetry for MIA and air crash victim identification, November 1986-1993.

Invited lecture on forensic image analysis, forensic photogrammetry, and the forensic use of geographic information systems for the American Society of Forensic Odontologists, at the annual meeting of the American Society of Forensic Odontologists, February 11, 1986.

Invited plenary address, National Association of Medical Examiners annual meeting, Tucson, Arizona, November 1986. Topic: Electronic Image Analysis for the Forensic Scientist.

Organizer, participant and moderator, workshop on "Hardware, Software, and Graphics: Photogrammetry, Photography, Image Analysis and Geographic Information systems for Forensics," Annual Meeting of the American Academy of Forensic Sciences, San Diego, CA, February 17, 1987.

rev. 11/2013

## Exhibit B

### LIST OF PUBLICATIONS

James Ian Ebert

**This list includes materials which have appeared in print, or which have been accepted for publication and are currently in press.**

1. Ebert, James I.  
1973 Research Design -- Sampling. In Wimberly, M. and P. Eidenbach, eds., **Human Systems Research Technical Manual**. Albuquerque, NM: Human Systems Research.
2. Judge, W. James, James I. Ebert, and Robert K. Hitchcock  
1975 Sampling in Regional Archaeological Survey. In Mueller, James W., ed., **Sampling in Archaeology**, pp. 82-123. Tucson: University of Arizona Press.
3. Lyons, Thomas R. and James I. Ebert  
1975 Chapter 26: People, Past and Present. Archaeology, Aerial Techniques. In Reeves, Robert G., ed., **Manual of Remote Sensing**, pp. 1999-2018. Falls Church, VA: American Society of Photogrammetry.
4. Ebert, James I. and Robert K. Hitchcock  
1975. Chaco Canyon's Mysterious Highways. **Horizon** XVII(4), Autumn 1975.
5. Lyons, Thomas R., James I. Ebert and Robert K. Hitchcock  
1976 Archaeological Analysis of Imagery of Chaco Canyon Region, New Mexico. In Williams, Richard S. and William D. Carter, eds., **ERTS-I, A New Window on Our Planet**, pp. 304-306. **USGS Professional Paper No. 929**. Washington, DC: US Government Printing Office.
6. Ebert, James I., Melinda C. Ebert and Robert K. Hitchcock  
1977 Anthropological, Archaeological and Ecological Investigations in the Central District of Botswana. **Botswana Notes and Records** 9, Gaborone, Botswana: The Botswana Society.
7. Ebert, James I., Melinda C. Ebert and Robert K. Hitchcock  
1976 Atmospheric Transmission of Solar Radiation: A Note on One Class of Data Being Gathered by the University of New Mexico Kalahari Project. **Botswana Notes and Records** 8, pp. 299-300. Gaborone, Botswana: The Botswana Society.
8. Ebert, James I., Melinda C. Ebert, Robert K. Hitchcock, and Axel Thoma  
1976 An Acheulean Locality at Serowe, Botswana. **Botswana Notes and Records** 8:29-37. Gaborone, Botswana: The Botswana Society.
9. Ebert, James I., Melinda C. Ebert and Robert K. Hitchcock  
1976 The Missing Link Between Past and Present. **Kutlwano** 15(9), p. 29. Gaborone, Botswana.
10. Ebert, James I., Melinda C. Ebert, and Robert K. Hitchcock  
1976 Archaeology/Tsa Segologolo: Tshwaraganyo E E Seyong Magareng A Segologolo Le Sesa. **Kutlwano** 15(9), p. 28. Gaborone, Botswana.
11. Ebert, James I. and Robert K. Hitchcock  
1977 The Role of Remote Sensing. In Reher, Charles A., ed., **Settlement and Subsistence Along the Lower Chaco River: The CGP Survey**, pp. 191-216. Albuquerque, NM: University of New Mexico Press.
12. Ebert, James I.  
1977 Remote Sensing Techniques Within an Archaeological Research Framework: Methods, Economics, and Theory. In Lyons, Thomas R. and Robert K. Hitchcock, eds., **Aerial Remote Sensing Techniques in Archeology**, pp. 169-201. Albuquerque, NM: National Park Service.

13. Ebert, James I. and Thomas R. Lyons  
1976 The Role of Remote Sensing in a Regional Archaeological Research Design: A Case Study. In Thomas R. Lyons, ed., **Remote Sensing Experiments in Cultural Resource Management: Non-Destructive Methods of Archeological Exploration, Survey, and Analysis**, pp. 5-9. **Reports of the Chaco Center** No. 1. Albuquerque, NM: National Park Service.
14. Pouls, Basil G., Thomas R. Lyons, and James I. Ebert  
1976 Photogrammetric Mapping and Digitization of Prehistoric Architecture: Techniques and Applications in Chaco Canyon National Monument. In Thomas R. Lyons, ed., **Remote Sensing Experiments in Cultural Resource Studies: Non-Destructive Methods of Archaeological Exploration, Survey, and Analysis**, pp. 103-115. **Reports of the Chaco Center** No. 1. Albuquerque, NM: National Park Service.
15. Ebert, James I.  
1976 Introduction. In Lyons, Thomas R., ed., **Remote Sensing Experiments in Cultural Resource Studies: Non-Destructive Methods of Archeological Exploration, Survey and Analysis**, pp. 1-3. **Reports of the Chaco Center** No. 1. Albuquerque, NM: National Park Service.
16. Hitchcock, Robert K., James I. Ebert, M. C. Ebert and A. Thoma  
1977 Serowe's Past: The Prehistoric and Historic Archaeology of the Bamangwato Tribal Capital. **Botswana Magazine**. Gaborone, Botswana.
17. Hitchcock, Robert K., James I. Ebert and M. C. Ebert  
1977 Regional Archaeological Research in Eastern Botswana. **Archaeologia Zambiana** No. 19, pp. 6-7. Lusaka, Zambia.
18. Hitchcock, Robert K. and James I. Ebert  
1977 Regional Studies of Basarwa (Bushmen) in Eastern Botswana. **South African Journal of Science**. Capetown, Republic of South Africa.
19. Hitchcock, Robert K., James I. Ebert, A. L. Crowell, H. V. Esche, and M. C. Ebert  
1978 Fishermen of the Nata River. **Botswana Magazine**. Gaborone, Botswana.
20. Ebert, James I.  
1979 An Ethnoarchaeological Approach to Reassessing the Meaning of Variability in Stone Tool Assemblages. In Kramer, Carol, ed. **Ethnoarchaeology: Implications of Ethnography for Archaeology**, pp. 59-76. New York City: Columbia University Press.
21. Hitchcock, Robert K., Bryan A. Marozas and James I. Ebert  
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1999 On the Map: Aerial Photographs Help in Environmental Site Assessments and Litigation. *Brownfield News* 3(5): 27-31. November 1999.
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2000 Shadowy Defense: 3D Modeling at the Scene of the Crime. *GeoSpatial Solutions* 10(7): 28-33. Advanstar Communications, Eugene, OR.
130. Ebert, James I.  
2001 The State of the Art in "Inductive" Predictive Modeling: Seven Big Mistakes (and Lots of Smaller Ones). In Konnie L. Wescott and R. Joe Brandon, eds., *Practical Applications of GIS for Archaeologists: A Predictive Modeling Toolkit*. Pp. 129-134. Taylor & Francis, London and Philadelphia.
130. Ebert, James I.  
2001 *Distributional Archaeology*. 2<sup>nd</sup> Edition. University of Utah Press, Salt Lake City.
131. Ebert, James I.  
2001 Photogrammetry, Photointerpretation, and Digital Imaging and Mapping in Environmental Forensics. In Robert Morrison and Brian Murphy, eds., *Introduction to Environmental Forensics*, pp. 43-69. Academic Press, London.
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2002 Integrating Archaeology and Photogrammetry with Fire Investigation. *Fire Engineering* 155 (2): 79-84. Fairlawn, NJ, February 2002.
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2007 Photogrammetry, Photointerpretation, and Digital Mapping in Environmental Forensics. In *Introduction to Environmental Forensics, 2<sup>nd</sup> Edition*, pp. 49-81, edited by Brial L. Murphs and Robert D. Morrison. Academic Press.

134. Ebert, James I. and Alberto A. Gutierrez  
1979 Relationships between Landscapes and Archaeological Sites in Shenandoah National Park: A Remote Sensing Approach. **APT: Bulletin of the Association for Preservation Technology**, Vol. XI, No. 4, pp. 69-87. Ottawa, Ontario, Canada.
135. Hitchcock, Robert K. and James I. Ebert  
2011 Where is that Job? Hunter-Gatherer Information Systems in Complex Social Environments in the Eastern Kalahari Desert. In *Information and Its Role in Hunter-Gatherer Bands*, pp. 133-166, edited by Robert Whallon, William A. Lovis and Robert K. Hitchcock. Ideas, Debates, and Perspectives 5, Cotsen Institute of Archaeology Press, Los Angeles.
136. Robert J. Blumenschine, Ian G. Stanistreet , Jackson K. Njau, Marion K. Bamford , Fidelis T. Masao, Rosa M. Albert, Harald Stollhofen, Peter Andrews, Kari A. Prassack, Lindsay J. McHenry, Yolanda Fernández-Jalvo, Eileen L. Camilli, James I. Ebert  
2011 Environments and hominin activities across the FLK Peninsula during Zinjanthropus times (1.84 Ma), Olduvai Gorge, Tanzania. *Journal of Human Evolution* (2011): doi: 10.1016/j.jhevol.2011.10.001

[rev. 04/2014]

**EXHIBIT C**

**EBERT & ASSOCIATES**  
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**Expert Report of Dr. James I. Ebert, Certified Photogrammetrist (ASPRS)**  
in the matter of Mellon v. TIGHAR

April 14, 2014

I am an anthropologist, an archaeologist, and a forensic scientist, and in each of these professional areas I make intensive use of the scientific methods and techniques of photogrammetry, photo analysis, digital imaging and image processing, and digital mapping technologies. I have more than 30 years of experience in the application of these methods and technologies in analyzing, measuring and mapping details of crime and accident scenes, archaeological and historic sites, and aspects of the interaction of the environment and cultural use of the landscape through time, using historic aerial and other photographs and image sources. I am a Certified Photogrammetrist [ASPRS] and have attached a resume and publications list detailing my education, experience, and qualifications.

Photogrammetry is defined by the American Society of Photogrammetry and Remote Sensing, our professional organization, as “the art, science and technology of obtaining reliable information about physical objects and the environment, through processes of recording, measuring, and interpreting imagery and digital representations of energy patterns derived from noncontact sensor systems.” Photo analysis is the process of identifying objects and conditions in aerial photographs and determining their nature, origin, meaning and significance.

Anthropology and archaeology are sciences that focus on the study and understanding of present and past human activities, ranging from those of ancient hominids (pre-human ancestors) and hunter-gatherers to historic and contemporary human industrial behavior, and how those activities both interact with the natural environment, and can be identified and detailed with reference to the materials people discard and the changes they cause in the landscape, and in surface and subsurface sediments and conditions.

In forensic or legal cases, I combine these scientific approaches and techniques to extract information from aerial and terrestrial photographs, other image sources such as video, and historic data such as maps and documentary evidence, to identify, measure, and map objects and details of the things and scenes depicted in such images.

I have been qualified in court testimony on 33 occasions between 1980 and the present as an expert witness in the use of photogrammetry, photo analysis, digital imaging and image processing, and digital mapping technologies as applied to forensic investigations, analyses, and reconstructions of crime, fire, and accident scenes, human land and resource use, and past and present human activities and their physical consequences through time.

In the present matter I was provided with digital data comprising:

- FullRes2010.mov: A full resolution copy of an eight-minute sequence of the 2010 ROV video
- Mellon Expert Disclosure: A folder containing the Plaintiff's Disclosure of Experts, their CVs, and their reports and exhibits
- TIGHAR Eval 2010: TIGHAR's response to the Plaintiff's request for all data evidencing analysis of the underwater footage or photographs from the 2010 Niku VI expedition

Given these data, I was asked to review the video sequence and the Plaintiff's experts' reports and exhibits and evaluate the appropriateness of their method or methods as a basis of reaching their opinion.

My opinion is that the Plaintiff's experts' method is inappropriate as a basis for reaching their opinion, which is that the shapes of two underwater formations which appear in the 8-minute video segment which they, and I, viewed, are debris from Amelia Earhart's Electra, specifically the aircraft's tail wheel and part of the front landing gear.

The method the Plaintiff's experts employ to reach this conclusion is to construct 3-dimensional CAD models of those aircraft parts based on dimensions taken from exemplar Electra parts. They then superimpose images of the 3D models on still frames from the video sequence by scaling the models and positioning them so they seem to "fit" over the shapes and sizes of the two features they contend are fragmentary remains of Amelia Earhart's aircraft.

The two formations focused upon by the Plaintiff's experts in the 8-minute video segment are identical in color and texture to the surrounding coral and/or sediments, giving no visual hint of consisting of metal and rubber. In addition, there is no way of determining scale in the video images, so they may be of virtually any size. For these reasons it is not appropriate, and even less is it conclusive in any way, to hypothesize that these are aircraft debris, rather than coral or rock formations. Photogrammetrists engaged in the identification of such ambiguous objects, features, or patterning in any imaged data insist on confirmation of their hypotheses by recourse to what is often referred to in the photogrammetric literature as "ground truth," a term historically derived from its conception as a way of testing conclusions based on aerial photographs by inspection of the areas involved on the ground as well as onphotographs (or in this case, video images).

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**Testimony by the witness within the preceding four years**

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2013

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**Chevron Corp. v. Donziger, et al.**, U.S. Federal Court, Case No. 11 Civ. 0691 (LAK). New York, NY. October 30, 2013.

**Dana Kruise, et al. vs Payne & Dolan, et al.**, Milwaukee County Case No. 10 CV 018726. Deposition testimony, July 18, 2013, Milwaukee, Wisconsin.

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2011

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**El Rucio Land and Cattle Company, Inc., San Juanito Land Partnership Ltd., McAllen Trust Partnership, and James Argyle McAllen, Plaintiffs**, vs. Forest Oil Company and Daniel B. Worden, Defendants. Arbitration testimony before the honorable Daryl K. Bristow, Clayton J. Hoover, and Donato D. Ramos. November 7, 2011. Houston, Texas.

**Union Oil Consolidated Coverages Cases Truck Insurance Exchange, Plaintiff**, vs. Union Oil Company of California, Defendant and consolidated actions filed by Hartford Accident and Indemnity Company and Great American Insurance Company. Superior Court of California, county of Los Angeles, Central Civil West, No. BC 271474. Deposition testimony, April 26, 2011. Los Angeles, CA.

**El Rucio Land and Cattle Company, Inc., San Juanito Land Partnership, Ltd., McAllen Trust Partnership, and James Argyle McAllen, Plaintiffs**, vs. Forest Oil Corporation and Daniel B. Worden, Defendants. Arbitration before the Honorable Daryl K. Bristow, Clayton J. Hoover and Donato D. Ramos. Deposition testimony, March 22, 2011. Albuquerque, NM.

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2009

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**Union Oil Consolidated Coverages Cases Truck Insurance Exchange, Plaintiff**, vs. Union Oil Company of California, Defendant and consolidated actions filed by Hartford Accident and Indemnity Company and Great American Insurance Company. Superior Court of California, county of Los Angeles, Central Civil West, No. BC 271474. Deposition testimony, June 2-3, 2009. Los Angeles, CA.

**Matthew Mayo, an individual, Plaintiff**, v. City of Gig Harbor; Jon M. Park; and Wan Cha Park, husband and wife, d/b/a Harbor Arco AM/PM, and each of them, Defendants. Superior Court for the State of Washington, County of Pierce, No. 07-2-12908-7. Telephone Deposition testimony, March 23, 2009. Albuquerque, NM.

**Publications authored by witness within preceding ten years**

Ebert, James I.

2007 Photogrammetry, Photointerpretation, and Digital Imaging and Mapping in Environmental Forensics. In *Introduction to Environmental Forensics, 2<sup>nd</sup> Edition*, pp. 49-81, edited by Brian L. Murphy and Robert D. Morrison. Academic Press.

Hitchcock, Robert K. and James I. Ebert

2011 Where is that Job? Hunter-Gatherer Information Systems in Complex Social Environments in the Eastern Kalahari Desert. In *Information and Its Role in Hunter-Gatherer Bands*, pp. 133-166, edited by Robert Whallon, William A. Lovis and Robert K. Hitchcock. Ideas, Debates, and Perspectives 5, Cotsen Institute of Archaeology Press, Los Angeles.

Robert J. Blumenschine, Ian G. Stanistreet , Jackson K. Njau, Marion K. Bamford , Fidelis T. Masao, Rosa M. Albert, Harald Stollhofen, Peter Andrews, Kari A. Prassack, Lindsay J. McHenry, Yolanda Fernández-Jalvo, Eileen L. Camilli, James I. Ebert

2011 Environments and hominin activities across the FLK Peninsula during *Zinjanthropus* times (1.84 Ma), Olduvai Gorge, Tanzania. *Journal of Human Evolution* (2011): doi: 10.1016/j.jhevol.2011.10.001

## Exhibit D

### CURRICULUM VITAE

### **LES KAUFMAN**

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Brookline, MA 02146  
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### **EDUCATION**

Undergraduate:	The Johns Hopkins University Bachelor of Arts, 1974 Earth and Planetary Sciences
Graduate:	The Johns Hopkins University Doctor of Philosophy, 1980 Theoretical Ecology and Evolutionary Biology

### **PROFESSIONAL POSITIONS**

2003-Current	Professor of Biology, Boston University, BU Marine Program (Associate Director 2007-2010); Center for Ecology and Conservation Biology; Faculty Fellow, Pardee Center for the Study of the Longer-Range Future, Kilachand Honors College Academic Affairs Committee; Marine Conservation Fellow, Conservation International.
2005-2012	Senior Marine Scientist, Conservation International
1994-current	Research Scholar, New England Aquarium
1994-2003	Associate Professor of Biology, Boston University
1990-1994	Chief Scientist, New England Aquarium, Boston
1989-1990	Senior Scientist for Ecology and Conservation, New England Aquarium
1987-1989	Curator of Exhibit Research and Development, New England Aquarium
1983-1987	Curator of Education/Research Scientist, New England Aquarium
1980-current	Associate in Ichthyology, Harvard Museum of C
1978-1980	Associate Research Scientist, Chesapeake Bay Institute, Baltimore, MD.

### **CURRENT PROFESSIONAL MEMBERSHIPS**

Sigma Xi  
International Coral Reef Society  
International Association of Nitrox and Technical Divers

## **EXAMPLES OF PROFESSIONAL SERVICES**

### **For the World Conservation Union (IUCN):**

Scientific Advisor, Freshwater Fish Specialist Group and Lake Victoria SSP (current)  
Member, Species Survival Commission (current)  
Chairman, Captive Breeding Specialists Groups for Aquatic Species

### **International Service**

Charles Darwin Foundation Program Committee, Galapagos, Ecuador (current)  
Board of Directors, Healthy Reefs for Healthy People (Mesoamerican Reef) (current)  
Core Science Team, Phoenix Islands Protected Area, Government of Kiribati (current)  
Rede Abrolhos Field Research Team, University of Rio de Janeiro, Brazil (current)  
Advisor on sustainable aquaculture, The World Bank (current)  
Working Group on Corals and Climate Change, Center for Ocean Solutions  
Advisor on marine impacts of climate change, The World Bank  
Chairman, Committee for Ecosystem Function of Open Ocean Biodiversity (SCOPE)  
Working Group Leader, Global Biodiversity Assessment (SCOPE)  
Principal Investigator, University Consortium for Lake Victoria  
Team Leader, Lake Victoria Research Team (Kenya, Uganda, Tanzania)  
Scientific Liaison in East Africa for Fisheries, Biodiversity, and Invasive Species, World Bank  
Advisory Board, Clean Water Alliance (Kenya)  
Advisor to the Director, Kenya Wildlife Service  
Consultant, Winrock International

### **For the New England Region:**

Ecosystem-based Management Working Group, Stellwagen Bank NMS (current)  
Science and Statistics Committee, New England Fisheries Management Council  
Research Steering Committee, New England Fisheries Management Council  
Downeast Initiative, Gulf of Maine  
Habitat Advisor, New England Fisheries Management Council  
Right Whale Advisory Committee, Commonwealth of Massachusetts  
Right Whale Advisory Board, New England Environmental Trust

### **For the National Science Foundation:**

Grant review panel member  
Ad-hoc reviewer: Ocean Sciences, Ecology, Biotic Resources, Science Education

### **For the National Oceanic and Atmospheric Administration:**

Grant review panel member  
Ad-hoc reviewer

### **For the National Research Council:**

Committee on Biodiversity Conservation

## **For Non-Government Organizations**

Marine Conservation Fellow, Conservation International (current)  
Research Scholar, New England Aquarium (current)  
North Atlantic Marine Alliance Fish Locally Collaborative (current)  
Ocean Policy Project, Commonweal  
Advisor to Northeast Marine Ecoregional Assessment, The Nature Conservancy  
Conservation Law Foundation

## **Advisory Boards**

Healthy Reefs for Healthy People (current)  
Stellwagen Alive! (current)  
Natural Capital Project Marine Initiative  
Pew Scholars Program in Marine Conservation  
Tufts Center for Animals  
Massachusetts Board on Rare and Endangered Species  
Earthwatch  
New England Aquarium

## **EDITORIAL SERVICES**

Associate Editor: Conservation Biology (1990-1997)  
Reviewer: MIT Press, PNAS, Ecology, Journal of the Linnaean Society of London, Journal of African Hydobiology, Ecological Monographs, Science, Copeia, Canadian Journal of Zoology, Estuarine and Coastal Marine Science, Environmental Biology of Fishes, Marine Biology, Evolution, Coral Reefs, American Journal of Botany, Oceanography, Ecological Economics, Behavioral Endocrinology, and others.

## **RECENT INVITED PRESENTATIONS**

The World Bank  
National Geographic  
Regional Association for Research on the Gulf of Maine  
IFReDI/Cambodian Fisheries  
Stanford University  
University of Massachusetts  
Pardee Center for the Study of the Longer-Range Future (BU)  
Switzer Center for Environmental Leadership  
Salon on the Modeling of Complexity in Biological Systems (BU)  
Pew Fellows for Marine Conservation, STRI, Panama

Selected Past:

Princeton University  
Geological Society of America  
Gordon Medical Research Conferences  
Agency for International Development (Washington and Kampala, Uganda)  
Center for Coastal Resources  
National Research Council

3rd European Congress on Ichthyology  
Ohio State University  
American Association of Zoological Parks and Aquariums  
Australian Institute of Marine Science  
Kenya Marine and Fisheries Research Institute  
Freshwater Fisheries Research Institute (Uganda)  
Michigan State University  
Wesleyan University  
University of Maine  
University of Maryland  
Tufts University Veterinary School  
Harvard University  
Brandeis University  
UMass Boston  
UMass Amherst  
Northeastern University  
American Society of Zoologists Public Forum on Biodiversity  
Association of Systematic Collections  
University of Rhode Island  
International Congress on Breeding Endangered Species  
New England Environmental Congress  
National Science Foundation Division of Biotic Resources  
University of California at Davis, Bodega Bay Marine Laboratory  
University of New Hampshire  
Columbus Zoo and Aquarium

## HONORS AND AWARDS

2012	Stone Memorial Lecturer, Mass Audubon Society
2011	Parker-Gentry Award in Conservation Biology
2011	"Head in the Sky" Award, Conservation International
2004	CAS Award for Distinguished Service in Academic Advising, Boston University
1991	Do Fish Get Thirsty? (New York: Franklin Watts Publishers), voted "Outstanding Science Trade Book for Children in 1991" by the joint committee of the Children's Book Council and the National Science Teachers Association.
1991	Plenary speaker, Gordon Medical Research Conference (Bone)
1991	Comparative Medicine Scholar of the Year, Tufts University
1990-1995	Pew Scholar for Conservation and the Environment
1986	The Last Extinction (Cambridge, MIT Press) selected by Library Journal as one of the "best 100 scientific technical books of 1986"

## GRANTS AND CONTRACTS

\$500,000	2012-2015	MacArthur Foundation, A Landscape Analysis Partnership for Ecosystem Services in Lac Tonle Sap and the Lower Mekong Basin (PI).
\$230,000	2012-2015	NSF CNH-Ex: Conflict and Fisheries in the Lake Victoria Basin" (one of three Co-PI's, Sarah Glaser PI; BU subcontract ca. \$40K still pending due to PI move).
\$2.9M	2010-2015	NSF STEM for GLACIER- Global Change Initiative- Education and Research (One of 6 Co-PI's, Suchi Gopal PI)
\$350,000	2010-2012	Massachusetts Ocean Partnership, to model ecosystem service production and trade-offs in Massachusetts Bay (PI).
\$480,000 Ecosystem	2009-2011	NSF-NOAA CAMEO for Comparative Dynamics of Components from the Northeast Atlantic Shelf and Pacific Coast: New Approaches to Forecasting and Understanding Variability and Structure in Marine Ecosystems (one of 5 Co-PI's, no direct funds to BU, Andrew Rosenberg PI).
\$232,000	2006-2008	Pew Institute for Ocean Science, for studies of fish behavior, population structure, and feeding habits relevant to effectiveness of marine reserves (PI).
\$70,000 Punta Gorda, Belize.	2005-2007	Earthwatch, for field work on coral reef health near Belize. Co-PI (with Burton Shank).
\$12.5m Conservation	2005-2010	Gordon and Betty Moore Foundation grant to International, for Marine Management Area Science Program. Senior PI (with DC and Regional Staff of Conservation International).
\$150,000	2005-2006	Northeast Consortium, to study the systematics and trophobiology of the sand lances ( <i>Ammodytes</i> spp.) on Stellwagen Bank, MA. (With Dr. Cliff Goudey, MIT and Massachusetts Fishermens' Partnership).
\$250,000	2004-2006	National Marine Fisheries Service, for studies of the effects of the Western Gulf of Maine Closure (exclusion of bottom-tending gear) on the food web. (With Massachusetts Fishermens' Partnership).
\$ 60,000	2003-2006	National Science Foundation, to study brain and behavior in Lake Tanganyika cichlids (subcontract on grant with Dr. Caroly Shumway, NEAq and Dr. Hans Hoffman, Harvard University).
\$ 22,500	2004-2005	Conservation Food and Health Foundation, for food web studies in Lake Victoria (with grad student William Ojwang).
\$150,000 (ecology of	2001-2004	Packard Foundation for Science into Practice California nearshore rock-reef fish assemblages). PI. Funds all to BU. (Burr Heneman, Co-PI).
\$ 29,474	2000-2002	Columbia University/Packard Foundation for effects of global climate change on coral reef ecology. PI. Funds all to BU.
\$ 7,000	2001-2002	MIT Seagrant, for morphological and functional derangement in aquacultured tautog. PI. Funds all to BU.
\$ 14,000		Economic Efficiency of Stellwagen Bank National Marine Sanctuary. 2001. Environmental Defense. Matthias Ruth (PI), Les Kaufman, James Lindholm, and Peter Auster. Funds to University of Maryland.

\$ 8,000	2001	National Fish and Wildlife Foundation, for Marine Life Management Project. PI. Funds to BU.
\$58,000	1999-2000	Center for Coastal Studies, to study edaphic factors affecting the reestablishment of saltmarsh on Cape Cod. PI (for research by graduate student, Gregg Moore). Funds to BU.
\$ 6,500	1998-2000	Pew Charitable Trusts for studies of anthropogenic disturbance to fish recruitment and survivorship processes at Portland Bight, Jamaica. PI. (P. Espeut, T. Goreau and T. McClanahan co-PI's). Funds to BU.
\$40,000	1998-1999	Mudge Foundation, for studies of anthropogenic disturbance to fish recruitment and survivorship processes on Stellwagen Bank. PI. (P. Auster and M. Ruth, co-PI's). Funds to Les Kaufman at BU.
\$59,500	1996-1999	Kendall Foundation, for studies of anthropogenic disturbance to fish recruitment and survivorship processes on Stellwagen Bank. PI. (P. Auster and M. Ruth, co-PI's). Funds to Les Kaufman at BU.
\$120,000	1996-1999	National Science Foundation, Faunal Attenuation: Predicting Spatial and Temporal Dynamics of Refugia in the Lake Victoria Basin. Co-PI. (L. Chapman (PI) and L. Chapman and T. Crisman, co-PI's). ca. \$30K to BU.
\$110,000	1997-1998	US Army, component of Johnston Atoll Science Study, to examine relationship of coral and fish biology to anthropogenic disturbance. Co-PI, funds indicate total to Kaufman from out of a program project grant. (P. Lobel, PI).
\$25,000 effects	1997-1998	Conservation Food and Health Foundation, to study of logging on population genetics of tropical forest trees. PI (for research by grad student, Elizabeth Stacy). Funds to BU.
\$18,000	1995-1996	Kalkan Pet Care, Inc., for research toward a field guide to the fishes of Lake Victoria and the White Nile Headwaters. PI. Funds to BU.
\$22,510	1994-1996	National Geographic Society, to study swamp refugia and corridors in the Lake Victoria basin.
(With Lauren Chapman (PI), Colin team in Africa.		Chapman and Richard Ongut-Ogwayo). Funds to
\$40,800	1993-1996	National Science Foundation, Refugia and Graveyards: Patterns of Species Survivorship in the Fish Fauna of Lake Victoria. (PI, with Lauren and Colin Chapman). Funds to BU.
\$180,000	1993-1996	National Science Foundation, to study the evolutionary genetics of the Lake Victoria cichlids (with P. Fuerst (PI)). Chapman, and Mark Chandler). ca. \$60K to NEAq and BU.
\$150,000	1990-1995	Pew Charitable Trusts, for research basic to the conservation of aquatic species and habitats, unrestricted award (PI). Funds to Kaufman, completed at BU.
\$6,000	1995	Pew Charitable Trusts, seed funds for studies of anthropogenic disturbance to fish recruitment and survivorship (PI, with Carl Safina). Funds to BU.

\$900,000      1991-1994      National Marine Fisheries Service, to study the biology of bluefin tuna (PI). Funds to Kaufman at New England Aquarium.

\$10,000      1993-1994      National Oceanic and Atmospheric Administration, for Technical Workshop on Methods for Remote Sensing of Coral Reef Degradation (PI, with C. Yentsch, University of Maine and C. Mazel, Massachusetts Institute of Technology). Funds to Kaufman at NEAq.

\$300,000      1991-1994      Saltonstahl-Kennedy Foundation, for studies on morbidity and mortality of groundfish bycatch in New England (PI, with Dr. A. Carr, Massachusetts Division of Marine Fisheries). Funds to Kaufman at NEAq.

\$700,000      1990-1994      National Institutes of Health, to study fish as models for skeletal regulation in humans (PI, with Dr. Julie Glowacki, Brigham and Women's Hospital). Funds to Kaufman at NEAq.

\$60,000      1992-1993      National Science Foundation, for Lake Victoria workshop (PI, with Peter Ochumba and Richard Ongutu-Ohwayo). Funds to Kaufman at NEAq.

\$40,000      1990-1991      National Science Foundation, for studies on limnology and fish extinctions in Lake Victoria (PI). Funds to Kaufman at NEAq.

\$29,500      1990-1991      US-AID, Fauna and water quality of African lakes (with L. Chapman, PI). Funds to team in Africa via U of Florida.

\$10,000      1990-1991      National Marine Fisheries Service, to initiate creation of a candidate species list for marine threatened and endangered species (PI). Funds to Kaufman at NEAq.

\$50,000      1990-1991      Institute for Museum Services, to complete draft master plan for Species Survival Program for endangered cichlid fauna of Lake Victoria, East Africa (PI). Funds to Kaufman at NEAq.

\$35,000      1990-1991      United States Virgin Islands Fisheries and Wildlife Department, to study stress physiology and conservation of blue marlin (PI). Funds to Kaufman at NEAq.

\$7,000      1990-1991      Conservation Food and Health Foundation to train a Kenyan graduate student in fish conservation work. (PI). Funds to Kaufman at NEAq.

\$25,000      1989-1990      National Oceanographic and Atmospheric Administration for studies on coral reef fish recruitment and community stability (PI, with Dr. John Ebersole). Funds to Kaufman at NEAq.

\$13,000      1990-1991      National Oceanographic and Atmospheric Administration grant for Lake Victoria Research Team (ongoing support for field logistics)(PI). Funds to Kaufman at NEAq.

\$25,000      1987-1988      Institute for Museum Services, to study changes in gut microflora of aquarium fishes exhibiting "failure to thrive syndrome" (with P. Boyle, PI). Funds to Boyle at NEAq.

\$275,000      1986-1989      National Science Foundation, Office of Informal Science Education, for creation of "The Thinking Gallery", an inquiry driven

	aquarium gallery to assist children in acquiring creative and rational thinking skills. (PI). Funds to Kaufman at NEAq.
\$21,000	1984-1986 National Science Foundation Australia-U.S. Cooperative Program, for "Case Study of a guild of plankton-eating reef fishes in Australia" (PI, with Dr. J.R. Strickler and Dr. David McB. Williams). Funds to Kaufman at NEAq.
\$25,000	1984-1985 Institute for museum Services, to study effects of diet nutrition and health of captive fishes (PI, with P. Boyle and P. Sieswerda).
\$22,000	1981-1982 National Oceanic and Atmospheric Administration for study of coral reef fish community structure (PI, with J. Ebersole).
\$15,000	1981-1982 UMass Public Service Grant to assess public health risks associated with eating bivalves and flounder from Boston Harbor (PI, with Michael Shiaris and Bob Egenhouse).

## PUBLICATIONS

Hanlon, R. and L. S. Kaufman. 1976. Associations of seven West Indian reef fishes with sea anemones. Bull. Mar. Sci. 26(2): 225-232.

Kaufman, L. S. 1976. Feeding behavior and functional coloration of the Atlantic trumpetfish, *Aulostomus maculatus*. Copeia 2: 377-388.

Kaufman, L.S. 1977. Threespot damselfish: effects of benthic biota of Caribbean coral reefs. Proceedings, Third International Coral Reef Symposium, University of Miami: 559-564.

Adey, W. H., P. J. Adey, R. Burke and L. S. Kaufman. 1977. The Holocene reefs of Eastern Martinique, French West Indies. Atoll Research Bull. 218: 1-40.

Woodley, J., et al. 1981. Hurricane Allen: Initial impact on the coral reef communities of Discovery Bay, Jamaica. Science 214: 749-755.

Kaufman, L.S. 1981. There was biological disturbance on Pleistocene coral reefs. Paleobiology 7(4): 527-532.

Kaufman, L. S. and K. F. Liem. 1982. Fishes of the Suborder Labroidei (PISCES: Perciformes): Phylogeny, ecology, and evolutionary significance. Breviora 217: 1-19.

Kaufman, L. S. 1983. Effects of Hurricane Allen on reef fish assemblages near Discovery Bay, Jamaica. Coral Reefs 2: 1-5.

Ono, R. D. and L. S. Kaufman. 1983. Muscle fiber types and functional demands in fish feeding mechanisms. Journal of Morphology 177: 69-87.

Liem, K. F. and L. S. Kaufman. 1984. Intraspecific macroevolution: functional biology of the polymorphic cichlid species *Cichlasoma minckleyi*. In: Evolution of Species Flocks. A. A. Echelle & I. Kornfield (eds.), pp. 203-215.

- Kaufman, L. S. and J. P. Ebersole. 1984. Microtopography and the organization of two assemblages of coral reef fishes in the West Indies. *J. Exp. Mar. Biol. Ecol.* 78: 253-263.
- Kaufman, L. S. 1987. Functional groups and the search for compensatory mechanisms in the population dynamics of North American freshwater fishes. pp. 4-1 to 4-15 In: R. G. Otto (ed.) *Mechanisms of Compensatory Response of Fish Populations*. EPRI EA-5202.
- Kaufman, L. S. 1987. Caught between a reef and a hard place: Why aquariums must invest in captive propagation. pp 365-362 In: *Proceedings of the National Meeting of the American Association of Zoological Parks and Aquaria*.
- Kaufman, L. S. 1988. The role of developmental crises in the formation of buttresses: A unified hypothesis. *Evol. Trend. Plants* 2(1): 39-51.
- Kaufman, L. S. 1989. Challenges to fish fauna conservation programs as illustrated by the captive biology of Lake Victoria cichlids. Pages 105-120 in B. L. Dresser, R. W. Reece, and E. J. Maruska, eds. *Fifth World Congress on Breeding Endangered Species in Captivity*.
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Glaser, S. M., M. J. Fogarty, H. Liu, I. Altman, C. Hsieh, L. Kaufman., A. D. McCall, A. A. Rosenberg, H. Ye and G. Sugihara. 2013. Complex dynamics may limit prediction in marine fisheries. *Fish and Fisheries*. Early online: DOI: 10.1111/faf.12037  
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Thusty, M. F., A. Rhyne, L. Kaufman, M. Hutchins, G. McGregor-Reid, C. Andrews, P. Boyle, J. Hemdal, F. McGilvray, and S. Dowd. 2013. Opportunities for public aquaria to increase the sustainability of the aquatic animal trade. *Zoo Biology* 32:1-12.

Altman, I., R. Boumans, J. Roman, S. Gopal and L. Kaufman. 2014. An ecosystem accounting framework for marine ecosystem-based management. *The Sea* 16: 245-276.

## Ph.D. Thesis

Kaufman, L.S. 1979. Damselfish gardens on Caribbean reefs: A natural disturbance and its effects on benthic biota. The Johns Hopkins University. Ph.D. Thesis.

## Representative Technical Reports

Becker, D.S., J.A. Conte and L.S. Kaufman. 1979. A bathymetric survey of the proposed Church Creek power plant site. Chesapeake Bay Institute, The Johns Hopkins University, Spec. Rept. 73, Ref. 79-4.

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Kaufman, L.S., R.G. Otto and P. Miller. 1980. On distribution and abundance of juvenile fishes in the Upper Chesapeake Bay. Chesapeake Bay Institute, The Johns Hopkins University, Spec. Rept.. 78, Ref. 80-1.

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Kaufman, L. S., and A. Strysky. 1991. Designation of marine species for protection under US Endangered Species Act. Report to the Office of Protected Resources, New England Aquarium, Boston.

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Karrer, L. B., M. Orbach and L. S. Kaufman. 2010. Marine Management Areas: What, Why, and How. Conservation International.

Kaufman, L. S., D. Obura, S. Sandin, and E. Sala. 2011. CHI: Coral Health Index. Conservation International.

## **Edited Books**

Kaufman, L. S. and K. E. Mallory (eds.). 1986, 1993. The Last Extinction. MIT Press, Cambridge, MA.

T.L. Crisman, L.J. Chapman, C.A. Chapman, and L.S. Kaufman (editors). 2003. Conservation, Ecology, and Management of African Freshwaters. University Press of Florida, Gainesville, Florida.

## **Semi-Popular Articles**

Note: In addition to the articles listed below, I have also published about a dozen articles over the years in "The Marine Aquarist," "Salt Water Aquarist," "Aquarium," "Tropical Fish Hobbyist," "BuntBarsch Bulletin," and "Skin Diver Magazine."

Hatch, J. and L.S. Kaufman. 1986. In the shadow of skyscrapers - bringing back the wild life of urban estuaries. Aquasphere, Journal of the New England Aquarium p. 7-10.

Kaufman, L. S. and O. Seehausen. 1995a. Cichliden von der ugandischen und der kenianischen Viktoriaseekuste. Pp. 147-153 In: von Drachenfels (Ed.). *Cichliden: Festschrift zum 25jährigen Jubilaum der DCG.*

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### **Book Reviews and Essays**

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Kaufman, L. S. and A. Cohen. 1993. The Great Lakes of Africa. *Conservation Biology* 7(3):632-633. (Essay)

Kaufman, L. 1995. "Touch one strand, and the whole web shivers." *Conservation Biology* 9(2):470-471.

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Kaufman, L. S. 2001. The impact of species changes in African lakes. *Copeia*.

Kaufman, L. S. 2001. Most excellent of fishes. *Natural History* 110(4): 84-85.

### **Representative Published Abstracts and Presented Papers**

Mwanja, W., M. Chandler, L. Kaufman and P. Fuerst. 1994. Population Structure and hybridization in fish: Lake Victoria tilapia studied with randomly amplified polymorphic DNA (RAPD) markers. *Ohio Jour. Science* 94(3).

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Chapman, L. J., C.A. Chapman, L.S. Kaufman, and M. Chandler. 1996. Wetlands as Refugia from Introduced Nile Perch in the Lake Victoria Basin of East Africa. American Fisheries Society, Deerborn, Michigan, August 1996.

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- M. Chandler, L. Chapman, R. Ongutu-Ohwayo, L. Kaufman, A. Armoudlian, and A. van Bismarck. 1997. Patterns of Fish Distribution in Response to Multiple Perturbations in the Lake Victoria Basin of East Africa.

American Society of Limnology and Oceanography, Santa Fe, New Mexico, February 1997.

L.S. Kaufman, L.J. Chapman, and P.F. Fuerst. 1998. Radiation and Extinction Mechanisms in Haplochromine Cichlids of the Lake Victoria Region. The Society for Integrative and Comparative Biology, Boston, Massachusetts, January 1998.

Kaufman, L.S. And I. Batjakas. 1998. Insights from a toy ocean: Invasion dynamics in Lake Victoria and implications for shallow marine ecosystems. Marine Bioinvasions, MIT.

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Mwanja, W. W., P. A. Fuerst, L. Wu, G. C. Booton, S. B. Wandera, and L. Kaufman. 1998. Ecological and Evolutionary Changes of Fish species in the Lake Victoria Region and Lake Edward - Albert System: the role of minor satellite water bodies. Proceedings of the 1998 International Association of Great Lakes Research.

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Kaufman, L., Mwanja, W.W. and Fuerst, P.A. 1998. Conservation genetics of Tilapiine refugia in the Lake Victoria region. Fisheries Society of the British Isles Symposium on Tropical Fish Biology, p. 31.

Mwanja, W., S.B. Wandera, L. Kaufman, P. Fuerst. 1998. Evolution of the haplochromine cichlid flock of the Lake Victoria Region: the bounty of the satellite lakes and their role in conservation of endangered taxa. Proceedings of the symposium on African Fish and Fisheries: Diversity and Utilisation, Grahamstown, South Africa.

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Schwartz, J.D.M. and Kaufman, L.S. 2000. Mechanistic Models and Community Ecology. Presented at the General Scientific Meetings of the Marine Biological Laboratory, August 14-16. Woods Hole, MA.

Kaufman, L.S. and Schwartz, J.D.M. 2000. The Future of Fisheries and Fisheries Research on Lake Victoria. Presented at the Lake Victoria Fisheries Organization's International Convention on Lake Victoria, May 16-19. Jinja, Uganda.

L.J. Chapman, C.A. Chapman, J.P. Olowo, P.J. Schofield, and L.S. Kaufman. 2000. Biodiversity Lost and Found: The Resurgence of Indigenous fishes in the Lake Victoria Region. The Ecological Society of America, Snowbird, Utah, August 2000.

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Mwanja, W.W., L. Kaufman and P.A. Fuerst. 2000. A case for reintroduction and restoration of cichlid fishes in Lake Vitoria Region waters: A means towards management and conservation of rare and endangered cichlid species. Proc. International Conference on the Conservation of African Inland Fisheries, Jinja, Uganda.

Fuerst, P.A., Mwanja, W.W., and L. Kaufman. 2000. The Genetic History of the Introduced Nile Tilapia Of Lake Victoria (Uganda - E. Africa): The Population Structure of *Oreochromis niloticus* (Pisces: Cichlidae) Revealed by DNA Microsatellite Markers. *ISTA V - Fifth International Symposium on Tilapia in Aquaculture*, Rio de Janiero, Brazil.

Schwartz, J.D.M., Ojwang, W., and Kaufman, L.S. 2001. The Effects of Nile Perch, *Lates niloticus*, on functional diversity in the lake Kyoga satellite system, Uganda. Presented to the Society for Conservation Biology annual meeting in Hilo, HI, July 29-August 1.

Kaufman, L. S. 2001. No reef is an island: effects of global climate change on nearshore marine environments of Mauritius. MERMAID 2001: Mauritius Environmental Resource Management and International Development, University of Mauritius.

R. Ogutu-Ohwayo, L.J. Chapman, C.A. Chapman, and Les Kaufman. 2002. Biodiversity Lost and Found: A Decade of Research on the Lake Nabugabo Wetland System.

Ramsar Conference for the Lake Nabugabo Region. Masaka, Uganda. January 2002.

R. Ogunu-Ohwayo, C.A. Chapman, L.J. Chapman, and Les Kaufman. 2002. Considering Terrestrial Systems in the Management of the Nabugabo Ecosystem. Ramsar Conference for the Lake Nabugabo Region. Masaka, Uganda. January 2002.

Lindholm, J., P. Auster , L. Kaufman , and S. Miller. 2002. Movement patterns and site utilization of fishes as determined by acoustic telemetry: implications for the design of marine reserves. Sustaining Seascapes: The Science and Policy of Marine Resource Management, American Museum of Natural History, March 2002.

#### **Independent Publications by Graduate Students and Post-Docs**

Batjakas, I. E. and A. E. Economakis. 1995. Coastal Fishes of Greece. Efstathiades Group, Athens, Greece. pp 129.

Ruth, M. and J. Lindholm. 1997. Dynamic Modeling of Multispecies Fisheries for Consensus Building and Management. Environmental Conservation 23: 332-342.

Stacy, E. A., J. L. Hamrick, J. D. Nason, S. P. Hubbell, R. B. Foster, and R. Condit. 1996. Pollen dispersal in low-density populations of three Neotropical tree species. American Naturalist 148:275-298.

Primack, R. B. and E. A. Stacy. 1997. Women ecologists catching up in productivity, but only when they join the race. Bioscience 47:169-174.

Parker, K. C., J. L. Hamrick, A. J. Parker, and E. A. Stacy. 1997. Allozyme diversity in *Pinus virginiana* (Pinaceae): Intraspecific and interspecific comparisons. American Journal of Botany 84:1372-1382.

Primack, R. B. and E. A. Stacy. 1998. Cost of reproduction in the Pink Lady's Slipper Orchid (*Cypripedium acaule*): an eleven-year experimental study of three populations. American Journal of Botany 85:1672-1679.

Heyer, C., P. Auster, and J. Lindholm. 1998. A Bibliography of Marine Protected Area Function and Design. Technical Report 98-01. Stellwagen Bank National Marine Sanctuary, Plymouth, Massachusetts.

Batjakas, I. E. and A. E. Economakis. 1999. The Greek Seashore. A Guide to the Marine Invertebrates. In Press. Efstathiadis Group, Athens, Greece.

Schwartz, J.D.M. 2000. Biological diversity in the Stellwagen Bank National Marine Sanctuary. Stellwagen Bank Technical Memorandum SBNMS-MPR-00-01. NOAA, Silver Springs, MD.

Lindholm, J. and P. Auster. 2000. Effects of fishing on sand habitats in Closed Area II. NOAA Technical Report.

Barr, B. and J. Lindholm. 2000. Conservation of the sea using lessons from the land. The George Wright Forum 17: 77-86.

Stacy, E. A., S. Dayanandan, B. Dancik, and P. D. Khasa. 2001. Novel microsatellite DNA markers for the Sri Lankan tree species, *Shorea cordifolia* (Dipterocarpaceae) and cross-species amplification in *S. megistophylla*. Molecular Ecology Notes 1:A20.

Stacy, E. A. 2001. Cross-fertility in two tropical tree species: evidence of inbreeding depression within populations and genetic divergence among populations. American Journal of Botany 88:1041-1051.

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Ruth, M and J. Lindholm (Eds). 2002. Dynamic Modeling for Marine Conservation. Springer-Verlag, New York. 449 pp.

Langton, R., J. Lindholm, J. Wilson and S. Sherman. 2002. An age-structured model of fish population enhancement: implications for conservation and economic sustainability. In: Ruth, M. and J. Lindholm. Dynamic Modeling for Marine Conservation. Springer-Verlag, New York.

Lindholm, J. and P.J. Auster. In Press. Marine Protected Area Design: Toward a Generalized Approach. In: Science and Management of Protected Areas: Learning From the Past and Links to the Future. SAMPA, Wolfville, Nova Scotia

Stacy, E. A. and J. L. Hamrick. In press. CTFS plots facilitate studies of tree breeding systems: Examples from Barro Colorado Island. Proceedings from conference: Forest diversity and dynamism: results from the global network of large-scale demographic plots. Center for Tropical Forest Science, Smithsonian Institute. Washington, D.C.

Stacy, E. A., S. Harischandran, and I. A. U. N. Gunatilleke. In Press. Reproductive ecology of *Syzygium rubicundum* (Myrtaceae) at Sinharaja Forest. Sri Lankan Forester.

### **Recent Work In Media and Public Outreach**

2009	Writer, Ranger Rick magazine article on coral reef fish communities.
2004	Writer, National Geographic article on color in coral reef fishes.
2003	Writer, National Geographic article on coral reefs of Fiji.
2002	Mission Scientist, National Geographic article on saturation science
2002	Mission Scientist, National Geographic article on marine biodiversity hotspots
2001	Scientific Advisor, New England Aquarium for the exhibit "Nyanza!" about my research and conservation program in the Lake Victoria region.
2001	Advisor, WGBH Television series on Evolution.
1994 -	Research Scholar, New England Aquarium (consultant on conservation, research and education programs, films, and major exhibits).
1996	Consultant to "The Magic Schoolbus" childrens' science television show

## Other Synergistic Activities

1. Higher Education: Founded the **The Seaging Eye** (1995), a partnership among Boston University, NOAA, the University of Maryland and regional fisheries that combines graduate training in marine conservation biology with practical experience at sea, in the laboratory, and in the fisheries policy and management boardroom. Current and past projects in Gulf of Maine, coastal California, the Florida Keys, Lake Victoria, and Mauritius.
2. Public Education: Advisor for refurbishment of New England Aquarium Caribbean Coral Reef exhibit. Advisor for proposed (NSF) exhibit on seamount biodiversity. Creative and scientific consultant for aquarium exhibit (NSF-funded) entitled “Nyanja: Africa’s Inland Sea” that toured US public aquariums. Advisor and Video Teacher, Video Teacher Project, Smithsonian Astrophysical Observatory (teacher training tape on how children understand concepts of energy flow differently from adults and professionals). Work frequently with National Geographic (print and television), WGBH Television, BBC Television, other print media, television and radio concerns in public communication about the oceans, evolution and conservation.
3. Problem-Solving: Senior PI, Marine Management Area Science Program (MMAS, comparative study of MMAs in the Galapagos, Panama, Fiji, Brazil, and Belize), Center for Applied Biodiversity Studies, Conservation International (2005-). Chair, “Marine Dream Team” for Gund Institute/UVM “Multiscale Integrated Modeling of Ecosystem Services” project (MIMES). Lead biologist, California Marine Life Management Project, 2000-current. Led Lake Victoria Research Team 1990-1996. Lead for biodiversity and introduced species, Preparatory Phase, Lake Victoria Environmental Management Project, 1992-1994. Work with New England Complex Systems Institute on the role of complexity in the generation and maintenance of biological diversity (current). Work with Columbia University’s Biosphere2 to study effects of global warming on coral reef organisms. Led work with Brigham and Women’s Hospital to develop fish as experimental model for bone disease in humans. Awarded Pew Scholar for Conservation and the Environment (1990-1995) in recognition of contributions to aquatic conservation science and policy and Parker-Gentry Award in Conservation Biology (2011) for lifetime work in conservation sciences.

## Graduate Students Trained

### *Ph.D. Degree*

Ioannis Batjakas (1998) Is there a "hypergeneralist" guild that dominates successful invasions? A case study of *Oreochromis niloticus*. Dr. Batjakas currently works for the Department of Fisheries, Greece.

Alistair Economakis (2000) The Impacts of Behavior and Individual Variation on Resource Utilization Patterns in Fishes. Supported by the Palmer-Mcleod Fellowship 1998-2000. Dr. Economakis working with Dr. Batjakas on plans for a major

public aquarium for Athens, Greece.

Joe Walsh (2000) Trophic level responses to combined nutrient-insecticide contamination in aquatic microcosms. Co-advised with Robert Gensemer. Dr. Walsh now works on the Florida Everglades Restoration Project with the Army Corps of Engineers.

Elizabeth Stacy (2001) Relatedness-dependent cross-fertility in tropical rainforest trees and the nature of species boundaries. Supported by the Conservation Food and Health Foundation. Dr. Stacy is currently a faculty member at the University of Hawaii, Hilo.

James Lindholm (2001) Effects of benthic habitat on juvenile survivorship in Atlantic cod, *Gadus morhua*. Co-Advisor, with Matthias Ruth, under the Ocean Conservation Project (OCP) with support from the Kendall Foundation, the Mudge Foundation, and the Pew Charitable Trusts. Dr. Lindholm served for two years as Science Coordinator for the Stellwagen Bank National Marine Sanctuary. He is currently Research Scientist at the Pflager Institute for Environmental Research (PIER) in California.

Jamie Bechtel (2002) The Role Of Sea Urchins in Coral Reef Regeneration. Supported by the Pew Charitable Trusts. Dr. Bechtel is the Director for Regional Marine Programs at Conservation International, Washington, DC.

Jesse Schwartz (2002) The Functional Role of Fish Diversity in Lake Victoria, East Africa. Supported by the David and Lucille B. Packard Foundation). Jesse Schwartz is the Director of Salmon Restoration Research for the Umatilla Tribal Nations of Oregon.

Gregg Moore (2002) The Biogeochemical ontogeny of restoration in a young Cape Cod marsh. Supported by the Center for Coastal Studies. Dr. Moore has continued his research in affiliation with the Center, and is now with UNH.

William Ojwang (2006) Aquatic Food Webs in Nyanza Gulf, Lake Victoria (Kenya). Mr. Ojwang is Senior Research Scientist with Kenya Marine and Freshwater Research Institute.

Burton Shank (2009) Effectiveness of marine managed areas of central and southern Belize: Spatial variations in major community processes and the implications for local management success.

Briana Brown (2012) Small-scale community structure and trophic ecology of groundfishes in the stellwagen bank national marine sanctuary under two anthropogenic disturbance regimes.

Tim Werner (expected 2015) Phylogeography of Indo-Pacific holothurians. Tim is a conservation scientist with the New England Aquarium.

Ben Carr (expected 2015) Ecosystem service trade-offs inherent to the biology of bluefin tuna and Atlantic cod.

Katey Lesneski (expected 2017) *Acropora cervicornis* colony life history in relation to coral reef recovery in the west Atlantic.

### **Current Co-Mentored Doctoral Students**

Liz Burmester (expected 2014) with John Finnerty. Coral defensome expression and lesion repair in the temperate coral *Astrangia poculata*.

Marta Ribera (expected 2014) with Suchi Gopal. Spatial dynamics of biomass aggregations on Stellwagen Bank, Massachusetts.

Valerie Pasquarella (expected 2014) with Suchi Gopal. Remote sensing of landscape structure and function in the watershed of Massachusetts Bay.

Natasha Gownaris (expected 2014) with Ellen Pikitch (Stony Brook University). Effects of climate change on fish food webs in Lake Turkana, Kenya.

Xingli Giam (expected 2015) with David Wilcove (Princeton University). Effect of silviculture on freshwater fish communities of peat swamp forest in Sumatra and Borneo.

Kong Heng (expected 2017) with Sovan Lek (Toulouse). Life history and fisheries science of the dominant fishes of Great Lake Tonle Sap, Cambodia.

### ***M.S. Degree***

Alissa Rickborn (exp. 2013) A contingency analysis of components driving fitness in the coral reef sponge *Aplysina fistularis*.

Eliza Garfield (exp. 2015) Effects of the territorial damselfish *Stegastes planifrons* on benthic community dynamics during coral reef recovery in Florida.

Stephanie Deckard (exp. 2015) Life history profiles of humpback whale as indicated by isotopic analysis.

Eli Romero (exp. 2015) Habitat connectivity through fish life history patterns as revealed by stable isotopic signals in the MesoAmerican Barrier Reef system of Belize.

Michael O'Boyle (2012) Role of migratory fishes in nutrient dynamics of Florida coral reefs.

Lauren Rader (1995) Non-thesis masters.

Jamie Bechtel (1996) Analysis of fluorescent pigments in coral reef cnidarians.

Lisa Kerr (1996) Embryonic abnormalities and reproductive output for the damselfish *Abudefduf sordidus* (Pomacentridae), relative to environmental contamination at Johnston Atoll, Central Pacific Ocean. Supported by the Johnston Atoll Research Project.

Edward Timmer (1997) Analysis of *Notropis bifrenatus* (Bridle Shiner) distribution with relation to landuse patterns at Massachusetts lakes using geographical information systems (GIS). Supported by The New England Aquarium.

Beatrice Bocking (1999) Predator-prey dynamics among endemic and introduced fishes in Lake Victoria.

Lucy Keith (1999) Movement patterns of pups of the endangered Hawaiian monk seal, *Monachus schauinslandi*. Supported by National Fish and Wildlife Service. Ms. Keith currently leads in manatee conservation studies with the Florida Department of Natural Resources.

Annie Konkle (2000) Phylogenetic analysis of new piscivores taxa from the Lake Victoria Region based on lepidological characters. Ms. Konkle works out of Seattle with the Sea Education Association.

Chris Bentis (2000) The distribution and role of microbial endoliths in selected hermatypic corals from Johnston Atoll and Hawaii. Supported by the Johnston Atoll Research Project, the David and Lucille Packard Foundation, and Columbia University/Biosphere2. Dr. Bentis is completing doctoral studies at the University of California at Berkeley.

Edmundo Perez (2001) A mass balance model for the rocky intertidal coast of central Chile. Supported by a Chilean scholarship. Mr. Perez has returned to Chile to work in Chilean fisheries conservation.

William Ojwang (2001) Stable isotope evidence for the functional role of the pelagic fish assemblage in Winam Gulf of Lake Victoria, Kenya. Supported by Lake Victoria Environmental Management Project (LVEMP). Mr. Ojwang is completing his doctoral studies at BU.

Lisa Bonacci (expected 2005) Comparative trophodynamics of sibling rockfish species in California. Supported by the David and Lucille Packard Foundation. Ms. Bonacci now works for the Northeast Fisheries Science Center, NMFS, Woods Hole.

Elizabeth Soule (2003) Effects of marine protected areas on food webs. Ms. Soule is completing her doctoral studies at BU.

Kevin Blinkoff (2006) Effects of Western Gulf of Maine Closure on distribution, abundance, and size-frequency distributions of groundfish assemblages.

#### ***Post-Doctoral Associates***

Dr. Irit Altman (2011 to current). Spatial and nonlinear dynamics of ecosystem service flows and tradeoffs in Massachusetts Bay, and Great Lake Tonle Sap, Cambodia.

Professor Maria Abate, College of General Studies, BU (2005-2009) Ethological and neurobiological aspects of brood capture behavior in Neotropical cichlids.

Dr. Caroly Shumway (2000) Neuroanatomical basis of behavior in African great lakes fishes. Dr. Shumway today directs Biodiversity Research at the New England Aquarium, and is a collaborator on continued studies of cichlid neurobiology with myself and Dr. Hans Hoffman of Harvard University.

Dr. Katherine Kavanaugh (1999) Ontogenetic staging for pomacentrid fishes using antibody stains for developmental morphogens. Supported by the Johnston Atoll Research Project. Dr. Kavanaugh is now at Harvard University with Dr. James Hanken.

### **Recent Examples of Undergraduate Research Training**

Lukas DeFilippo (2012) Effect of herbivory on lesion repair in the coral *Pocillopora damicornis*.

Erin Taylor (2012) Stable isotopic indicators of life history in northwest Atlantic squids.

Jennifer Kim (2011) Stable isotopic ratios as measure of benthic-pelagic coupling in the Mid-Atlantic Bight.

Rachel Golden (2009) Lesion repair and gene expression in the lace coral *Pocillopora damicornis*

Emily Munday (2009) Coral reef benthic community structure in Belize.

Daniel Primack (2008) Feeding mechanics of west Atlantic sand lance fishes.

Nalini Gupta (2007) Origins of cellularity in the zebrafish skeleton.

Beth Dubofsky (2007) Feeding behavior in the starfish *Astropecten*.

Andy Fogel (2007) Comparative feeding form and function in northwest Atlantic sibling species of sand lance, *Ammodytes*.

Lauren Taylor (2007) Management area effects on the Belizean coral reef.

Lauren Nadler (2007) Lesion repair in the Indo-Pacific coral *Pocillopora damicornis*.

Colin Riley (2007) Quantitative analysis of environmental forcing in Belizean coral communities.

Kari Bogner (2006) Genomic basis for cellularity in the zebrafish skeleton.

Shahrinaz Mahmoud (2006) A lesion repair assay for Pacific corals.

Amber York (2005-2006) Awareness of spatial novelty in two coral reef gobioid fishes.

Daniel Primack (2005-2006) Feeding biology of captive sand lance, Ammodytidae.

Carrie Soltanoff (2005-2006) Influence of the Western Gulf of Maine Closure on feeding biology of four skate species on Stellwagen Bank.

Kara Coffey (2004-2005) Differential response of Lake Tanganyika cichlids to spatial novelty and its neuroanatomical correlates.

Niora Fabian (2004-2006) Population structure of California sheephead.

Rupa Ghopal (2004-2005) Effects of a marine reserve on the trophobiology of longhorn sculpin and eelpout.

Katherine Bishop (2004) Effects of a marine reserve on the trophobiology of haddock and cod.

Ji Lee (2004) Effects of a marine reserve on the trophobiology of flatfishes.

Phoebe Jekielek (2002) *Astropecten spp.* as predators on juvenile sea scallops, *Plagopecten magellanicus*, in the northwest Atlantic. Supported by the National Marine Fisheries Service.

- Kristine Faloon (2002) Effect of dietary history on effectiveness of molluscivorous haplochromines as control agents for human schistosomiasis. Supported by a UROP award. Senior Distinction.
- Kristin Marshall (2001-present) Culture induced derangement in Tautog, *Tautoga onitis*. Independent research. Supported by MIT SeaGrant.
- Sarah Gallo (2001-present) The functional role of fish diversity in California's Big Creek Reserve. Independent research. Supported by the David and Lucille Packard Foundation.
- Pamela Woods (2001) Bioacoustics, plasticity and speciation of Lake Victoria cichlids. Senior Thesis and Senior Distinction. Supported by UROP.
- Sarah Wingert (2001) The heritability and natural variance of metabolism in Lake Victoria haplochromine cichlids. Senior Thesis. Supported by UROP.
- Taylor Chapple (2001) The affects of prey type and evasion tactics on the cost of prey capture; lessons from Nile perch, *Lates niloticus*. Senior Thesis.
- Jade Williams (2001) Reticulate evolution and niche segregation in Lake Victoria cichlids; evidence from the ram-suction index of a hybrid and its parents. Senior Thesis.
- Alpa Pattel (2000) Skeletal plasticity of teleost fish: Lessons from diet induced morphological shifts in a Lake Victoria cichlid. Senior Thesis. Supported by UROP.
- Michelle Monet (2000) The effect of intergeneric hybridization on the functional morphology of haplochromine cichlids. Work for Distinction. Supported by UROP.
- Kristen Agar (2000) Otolith analysis of daily growth increments in Lake Victoria Haplochromine cichlids. Undergraduate Research.
- Jessie Muhlin (2000) Behavioral analysis of herbivorous fishes in a coral reef mesocosm, Biosphere 2. Supported by UROP.

### **International Student Training (single or multiple study visits)**

- George Owen, York University (UK). Ecosystem consequences of a sand lance fishery in the North Sea and Gulf of Maine.
- Eli Romero, University of Belize. Habitat connectivity in Belizean reef fishes. Supported by MMAS.
- Dismas Mbabazi, Ugandan Fisheries Resources Research Institute (FIRRI). Food web dynamics in Lake Victoria Region satellite lakes. Supported by LVEMP.
- Wilson Mwanja, Ugandan Fisheries Resources Research Institute (FIRRI). Conservation genetics and phylogeography of Lake Victoria Region fishes. Supported by The World Bank and the National Science Foundation.
- Sylvester B. Wandera, FIRRI. Biology of Lake Victoria haplochromine cichlids. Supported by the Lake Victoria Environmental Management Project (LVEMP).
- Robert Amiina, FIRRI. Stable isotope analysis of haplochromine cichlids from the Kyoga Lakes refugium, central Uganda. Supported by LVEMP.
- Brian Ddungu, FIRRI. Internship in basic curatorial, laboratory, and computer skills.
- Peter Ochumba, Kenya Marine and Fisheries Research Institute (KMFRI). Limnology and biodiversity in Lake Victoria. Supported by the National Science Foundation and the National Oceanic and Atmospheric Agency.
- William Ojwang, KMFRI. Biology of Lake Victoria haplochromine cichlids. Supported by LVEMP.
- Joyce Kulekana, Tanzanian Fisheries Research Institute (TAFIRI). Biology of Lake Victoria cichlids. Supported by LVEMP.

Salome Mwaiko, TAFIRI (due March 2002). Biology of Lake Victoria haplochromine cichlids.  
Supported by LVEMP.

**Outside Examiner, International Students**

Gladys Bwanika, Makerere University, Kampala, Uganda, Ph.D.

Niels Buton, University of Leiden, Ph.D.

Gertrude Namulemo, Makerere University, Kampala, Uganda, MS

S. B. Wandera, Makerere University, Kampala, Uganda, MS

Mbabazi Dismas, Makerere University, Kampala, Uganda, MS

**Research Statement**

My laboratory works in the world's oceans and lakes on the scientific underpinnings for biological conservation and societal sustainability. We study the behavior of coupled human and natural systems in coastal environments, both marine and freshwater, and facilitate the application of what we learn in the policy arena. Our primary activity is field study of aquatic community dynamics using the most basic tools: transect tape, slate, camera, net, meter stick. These are backed up by stable isotope analysis, analytical and simulation modeling, and experimental transcriptomics in the laboratory. Our specialties are tropical reef and great lake fish communities, ecosystem based management, and the biology of coral reef recovery.

We are currently engaged in detailed study of coastal ecosystem services and their tradeoffs, with active projects in Massachusetts Bay (Stellwagen Bank National Marine Sanctuary), coastal Brazil (Bahia and Abrolhos Bank), Cambodia (Tonle Sap Great Lake), and East Africa (Lakes Victoria and Turkana), with long term interests in Kiribati (Phoenix Islands Protected Area), Belize and Jamaica. The goal, beyond understanding community dynamics, is to better enable ecosystem-based management. To this end, we explore the non-linear time evolution of fish populations, long-term dynamics of productivity and benthic-pelagic coupling on offshore banks, and coral reef resilience to local stressors and global climate change. We recently completed a major study with Conservation International on the ecological and socioeconomic effects and efficacy of marine management areas (quilts of coastal ocean under different types of management), called MMAS ([www.science2action.org](http://www.science2action.org)). We continue a close association with the science program at CI, working on adaptive management and climate adaptation, ocean health diagnostics, and ecosystem service modeling. In applications, we strive to develop practical ecosystem process diagnostics and quantitative biological reference points for ecosystem-based management of human activities on the continental shelf. Our work on coastal and freshwater EBM has been supported by the National Science Foundation, the Packard Foundation, the Pew Charitable Trusts, the Gordon and Betty Moore Foundation, the MacArthur Foundation, the Northeast Consortium, NOAA, and private donors.

## Exhibit E

### Dr. Kaufman's Report

#### Boston University

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April 13, 2014

Gentlemen/women,

I have examined the evidence concerning claims that ROV video footage obtained by TIGHAR at Nikumaroro Island reveals pieces of the airplane flown by Amelia Earhart on her ill-fated round-the-world flight of 1937. Though intimately familiar with coral reef environments around the world, including a wide array of submerged objects, both natural and man-made, I am unable to conclude that the debris visible on the disputed video is attributable to Earhart's aircraft, or for that matter, any aircraft. The analysis in support of this contention was ingenious and does open up at least the suggestion that aircraft remains might be visible on the video, but it is in my judgment an utterly, vanishingly small probability. It is much more likely that the objects cited are natural bits of carbonate rock plus a few lengths of rope and pieces of metal of obscure, and most likely fairly recent origin.

I am a marine biologist who specializes in coral reef biology and geology. I have been diving on and studying coral reefs in the Pacific, Atlantic, and Indian oceans for more than forty years, totally approximately 2500 SCUBA dives, four prolonged saturation and surface-support missions, and the routine use of several remote operated and benthic camera sled vehicles. In addition, I have for the past six years been an active member of the Phoenix Islands Protected Area Research Team. I was on a month-long 2009 expedition to PIPA that included a several-day stay at Nikamaruro Island and use of an ROV to study areas near, but shallower than (70 to 90 meters vs. ca. 250+ meters) the debris site in question. I also visited the island and snorkeled areas between the main channel and the Norwich City wreck, in addition to dives on the seaward face of the reef around the atoll edge at our regular study sites. During my career I have had occasion to examine a very wide range of metallic and other man-made objects that had been lost or abandoned in coral reef environments for anywhere from a few days to many decades or centuries underwater. This has included a good deal of military and aeronautical debris. I am also frequently involved in the analysis and interpretation of underwater video as part of our assessment work on coral reefs, in the Gulf of Maine, and in tropical great lakes.

The experts consulted in the Mellon disclosure claim to see aircraft wreckage in the deep video taken by TIGHAR during the 2010 Niku VI Expedition. I have examined said video prior to, and after having examined the expert reports and exhibits associated with the Mellon disclosure.

The methods used to construct, rotate, scale, and superimpose outlines of known plane parts upon objects seen in the video were effortful and clever. However, I did not find the demonstration convincing. All that I could make out unambiguously on the video, even after the powerful suggestions brought forward by the superimposed diagrams, were two pieces of rope of different gauge, a circular piece of wire, a few other pieces that could conceivably be man-made debris, and a very great deal of largely unconsolidated carbonate reef rock. Carbonate reef rock is simply limestone that was secreted in a particular shape by hard corals, coralline algae, or some combination of one growing upon the other. Some individual pieces of carbonate visible in the video could understandably be taken to suggest artificial objects due to smoothly rounded or crossed forms. However, many of the massive coral species in the Phoenix Islands (most especially massive *Porites spp.* and *Montipora spp.*) exhibit cleanly spherical or saucer-shaped growth forms that could easily be mistaken for an encrusted wheel of some sort, are extremely abundant, and span the appropriate size ranges. Also, much of the coral debris that falls down the fore-reef slope includes bits of branching corals which, when intersecting, fused, and subsequently broken free, will frequently resemble the form of a cross or an "X" and thus appear, convincingly to some, to be of human artifice.

One surprising aspect of the video is the relatively small amount of carbonate mud or silt overlying the rocks at that depth. I noticed this myself while exploring the shallower reaches of the reef with an ROV in 2009, and I've also seen similar videos taken on earlier PIPA Research Team expeditions. I attribute the low volume of visible silt to the steepness of the reef face and the strength of the ambient currents. The combination of poor consolidation and limited silt amplifies the appearance of there being many separate objects of interesting shapes scattered about. On a more gradually sloping reef face the carbonate rubble is usually more deeply immersed in carbonate sediment and much less distinctive in its presentation.

In order for to regard the expert claims as worthy of further attention, a minimum of three conditions would need to be met. First, there must be a rigorous analysis of alternative interpretations. The disclosure's arguments for the identity of individual objects as pieces of not only *an* aircraft but *the* aircraft are certainly titillating, but they are subjective and entirely lacking in rigor. Second, there must be estimation error associated with each purported object identification- in other words, how good is the fit, by what means can a differential diagnosis be conducted, and how many other, similar fits could be found in the fields of view? Finally, it is important to remain skeptical of any purported identification unless the object has been examined directly. At a minimum, it is necessary to turn over and reposition an object several times to be certain that a postulated identity survives multiple perspectives. Of course, best is to assess the object in such a way as to see through the overlying layers of carbonate encrustation, either by exfoliating them, or more conservatively, but examining the object under x-ray illumination. Nothing of the sort can be done with only a video in hand.

In sum, I must unfortunately conclude that not only does the work in the disclosure **not** constitute evidence for an aircraft debris field, but if anything it highlights how difficult it may actually be to detect bits and pieces of Earhart's plane should someone at last come upon the genuine articles. This is sobering, for although my interest in Nikumaroro Atoll is focused on the health of the coral reef, wildlife, and surrounding waters, the possibility of finding evidence of Earhart's former presence there is tremendously exciting. Consequently, all of us who visit this site are highly, even passionately motivated to try and do so. As scientists, however, we must remain assiduously objective. From such an objective standpoint, I regret to have to say that I am entirely unconvinced, and not even mildly suspicious, that the 2010 TIGHAR expedition produced evidence of an aircraft debris field on the reef at Nikumaroro. Furthermore, I am highly skeptical that any amount of further analysis or review of this video, in the absence of material evidence based upon manipulation and close physical study of the objects in question, will be likely to alter this conclusion.

Sincerely,



Les Kaufman  
Professor of Biology  
Boston University Marine Program  
And  
Marine Conservation Fellow  
Conservation International